

AVIATION

The Oldest American Aeronautical Magazine

JUNE 23, 1924

Issued Weekly

PRICE 10 CENTS



A new gliding record—the German pilot Schulz stays up 8 hr. 42 min.

Shown With World

VOLUME
XVI

SPECIAL FEATURES

NUMBER
25

AVIATION MEET AT MILLER FIELD
FROM KEYPORT TO PORTO RICO AND BACK
EQUIPMENT REQUIRED FOR HIGH ALTITUDE FLYING
PROGRESS OF THE AMERICAN ROUND THE WORLD FLIGHT

GARDNER PUBLISHING CO., Inc.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office at Highland, N. Y.
under Act of March 3, 1879.

FARMAN

SPORT PLANES



FOR THE PILOT OR SPORTSMAN WHO WISHES THE BEST
Imported from France, where they are built in their order at the Largest Aircraft Factory in the World.
THE MODELS BUILT IN U.S. DELIVERED PHILADELPHIA

ATLANTIC BUILDING

WALLACE KELLETT CO. INC.

PHILADELPHIA, PENNA.

LEARN TO FLY

The Flying school of the Robertson Aircraft Corporation is one of the oldest and most famous in the United States. All of the latest and best flying schools with a complete and well equipped in the best and newest way here. The flying field is approximately 100 miles from the city of St. Louis and is easily accessible by railroad, motor car and bus without delay. It is in the upper and best available ground land in the country and the schoolhouse for about 1934 was built here.

Our course includes thorough flying training as well as complete instruction in the most advanced and latest ways of flying the airplane and motor. Every graduate of our course is guaranteed to qualify for a pilot's license. The tuition is \$225, but you can pay \$40 a month for 6 months (1/3 of any surplus the school or school agent).

ROOM AND BOARD ON THE FIELD

AIRPLANES

\$480-\$3500 INCLUDING INSTRUCTIONS

We have approximately thirty five airplanes ready for instruction. Various models of the Cessna, Stearman, and other well known models. They are all in plain colors with Liberty and all modern. You can see all the latest single engine and multi-engine and every a complete line of spare parts for all airplanes and all parts including engine parts, fuel, oil, and other parts. Liberty Motors Station and a Liberty motor.

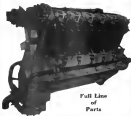
WRITE FOR CATALOGUE

EASY ON YOUR ORDERS IN MODER SERVICE

ROBERTSON AIRCRAFT CORPORATION

ST. LOUIS FLYING FIELD, ANGLEN, MO.

LIBERTY MOTORS

Full Line
of
Parts

THE ONLY NEW LIBERTY MOTOR
BEING BUILT IN AMERICA

Johnson Motor Products, Inc.

818-822 W. 87th Street New York City

JUNE 23, 1934

AVIATION

VOL. XVI NO. 25

Published every Monday

CONTENTS

Editorial	655	British World Flight	651
From Keyport to Boston River and Back	656	Boeing Pursuit	651
Continued World Flight	657	Locking Airplanes Tested	651
With Lee and the Helicopter	657	Aviation in Congress	652
Engineered Required for High Altitude Flying	658	Four Flight Propeller Tests	652
Light Airplane Engine	659	Light Plane and Helicopter	652
Special Guard Air Meet at New Derry	670	Airports and Airways	655
Explosive Bomber Helicopter Race	671	United States Air Force	658
Continued World Flight	671	Blackburn	659

GARDNER PUBLISHING COMPANY, Inc., Publishers

GENERAL AND EDITORIAL ROOMS: 225 FOURTH AVENUE, NEW YORK

Publication office

HIGHLAND, N. Y.

Subscription price: Four dollars per year. Single copies
15 cents. Canada, five dollars. Foreign, six dollars
a year. Copyright 1934, by the Gardner Publishing
Company.

Issued every Monday. Forms close two days previously.
Entered as second-class matter May 22, 1909, at the
Post Office at Highland, N. Y., under act of March
3, 1879.

COST

QUALITY



PERFORMANCE

MAINTENANCE

THESE FOUR CARDINAL VIRTUES
HAVE NEVER BEFORE BEEN COMBINED TO SO GENEROUS AN EXTENT AS IN THE
BOEING PURSUIT

IN RECOGNITION OF THIS FACT THE UNITED STATES GOVERNMENT HAS INCLUDED A NUMBER
OF THESE PLANES IN ITS PRESENT BUILDING PROGRAM

BOEING AIRPLANE COMPANY

CONTRACTORS TO UNITED STATES GOVERNMENT
GEORGETOWN STATION, SEATTLE, WASH.

A BOOK WHICH YOU ALWAYS HAVE WANTED

Numerous readers of AVIATION have from time to time asked to be referred to a book which would give them an up-to-date review of the historical development of aeronautics. Until the publication of

A HISTORY OF AERONAUTICS

we have been unable to refer readers to such a book because there was none.

Now we can do so and save you money.

A HISTORY OF AERONAUTICS is an accurate record of flight from the earliest legends down to the close of 1920. It is a thrilling narrative because it describes in simple language man's greatest conquest, with many accounts in the exact words of the pioneers themselves. Its 521 pages, profusely illustrated with original photographs and drawings, comprise

THE ONLY COMPLETE HISTORY OF THE ART AND DEVELOPMENT OF AERONAUTICS, both heavier and lighter than air.

The authors, E. C. Vinton, formerly editor of the British publication "Flyer," and Lieut. Col. W. Lockwood Mack, Secretary of the Royal Aeronautical Society, are recognized throughout the aeronautical world as authorities on the subject.

Voluminous chapters are devoted to the magnificent American contribution to flight in accounts of the experiments and achievements of the Wright Brothers and other pioneer Americans.

The development of the internal combustion engine is thoroughly covered as not too technical for the general reader, yet with an accuracy and understanding which will be appreciated by the engine expert.

Beside a comprehensive index, there is an excellent bibliography as the recognized reference and technical works in the varied branches of aeronautics.

The following sections and chapter headings will indicate the great store of valuable information which the book contains:

Part I—The Evolution of the Aeroplane

The Period of Legend
Early experiments
Sir George Cayley Thomas Walker
The Montgolfier balloons
Guthrie, La Roche and other ideas
The age of the balloon
Leonard and John Smith
Aeroplanes lifting experiments
The French
Scientific flight—Lamarie
The Wright Brothers
The First Tests of Success
First Flights in England
Kites and other
The Channel Crossing

Section on Manoeuvre

A Summary—in 1911
A Summary—in 1914
The War Period—in
The War Period—in
1918-1919

Part II—1900-1920 Progress in Design

The progress
Development of the
Progress in Significant Lines
The War Period
Part II—1900-1920 Progress in Design
The War Period
The War Period

Section on Engines

The Military Developments
British Army Developments
The Army Developments
The Army Developments

Part III—Engine Development

The engine types
The engine types
The engine types
The engine types
The engine types
The engine types
The engine types
The engine types

A short bibliography of Aeronautics

The retail price of A HISTORY OF AERONAUTICS is Six Dollars, but this is

OUR MONEY SAVING OFFER

We will send you the book, postage paid, and enter your subscription to AVIATION for one year (52 issues) for \$6.00 (Canada \$6.50, Foreign \$7.00). In a word you will secure this most valuable historic work and a four dollar subscription to America's leading aeronautical magazine and the only weekly for the price of the book alone.

This is a special offer which will expire with our present limited supply of A HISTORY OF AERONAUTICS. Use the coupon now to reserve your copy.

AVIATION

AVIATION

325 FIFTH AVENUE, NEW YORK

For the enclosed Six Dollars (Canada \$6.50, Foreign \$7.00), send me promptly a copy of A HISTORY OF AERONAUTICS and enter my subscription to AVIATION (52 issues).

L. D. LAMBERT

President

L. D. LAMBERT

Treasurer

Committee

Executive Committee

Vol. XVI

JUNE 23, 1924

No. 25

The Training of Air Pilots

AMONG the numerous problems with which the Air Service is faced, none are so serious as the procurement of men of the type of planes and the maintenance of a reserve of well trained pilots. The first named problem is constantly kept before the various manufacturers of aircraft, and is not so much a first class of selection, but the second named problem, it seems to us, is rather being neglected.

On account of the fact arrived at, it is impossible to keep from a student of flight in the Army and Navy Air Service. While we have in theory some 5000 reserve pilots who are trained during the war, actually most of these men have not made a step since the Armistice, and most of them are, as we will see, too old to form good aviation material in a future emergency. The problem of an ample reserve of Service type fliers will then soon become an acute one. A pilot becomes obsolete almost as quickly as the day he flies. The problem, then, is to give each year flying instruction to a sufficient number of new and young recruits who will keep on flying either in commercial aviation or in a sport and a war emergency sense.

This problem is being looked at present in different and at altogether un satisfactory ways. The Army gives at Brooks Field an excellent flying course to civilians entering for the purpose of flying Cadets, and drawing regular Army pay. Upon completion of the course, the Cadet is discharged and goes to a second lieutenant's commission in the Air Service Reserve Corps. The Navy operates three divisions for cadets, each under a similar scheme.

The trouble with this system is not that it does not turn out good pilots, for it does, but rather that it does not suffice to better advantage the available civilian flying schools. The latter turn out every year a large number of fairly well, but uncomparably, trained pilots. The general experience is that after a student has school, the school finds it almost impossible to make him continue his course until he becomes a really competent pilot. The lack of interest in flying, on one hand, and private activities, on the other, cause many a student to leave the school with the excuse he has purchased after only his home training. The absence of technical instruction of pilot, and a general disregard of the need of an F. A. I. Pilot's Certificate, makes the school powerless to prevent this early exit. And of such a one half of one per cent pilot makes, in the school that gets the "black eye," together with the present aspect of flying.

Now it would seem as if the Army and Navy Air Service would bring about a state of affairs in this situation. It is a good idea that, as is the case in France, England and Italy, the Service draw up an approved list of civilian flying schools which they consider competent to give primary training and that they pay them a standard bonus for each pilot turned in accordance with an approved program. The pilots

who show special aptitude and who come up to certain requirements would then be given a chance to take an advanced training course at Army or Navy air stations, upon completion of which they would be given a rating or rank in the Service.

Some such scheme as outlined here roughly, would have several advantages over the system now in vogue. First it would turn out competent reserve pilots who would be a great asset to the Service, because their primary training followed certain Service requirements, and because they would generally keep up their flying in commercial aviation. Second, the military authorities would save money now spent in the Pilotage course that the civilian flier they train will keep up flying—which is not generally the case, for the man who takes up flying as a hobby is as a rule as not, one of a hurry to go through a Brooks Field course. Third, the system would profit the civilian schools, both by obtaining for them large numbers of students and by safeguarding their reputation. And fourth, and not the least important of all, it would raise the safety standard of civilian flying a whole lot, provided the approved schools would agree not to train students under lower standards than those specified in the approved program.

Martyrs to Science

THE tragic death of First Lieut. James T. Noyes, A. S., and Dr. C. LeRoy Messinger, meteorologist, Weather Bureau, on June 5, 1924, while on official duty in flight over Illinois in a fire balloon, removes two of the ablest men from the younger ranks of practical research workers of the world.

Both of these men were without equal in their own particular line of endeavor. Both were experts in aerial investigation. Noyes in air navigation and Messinger in aerial charting. The very happy arrangement of having the Weather Bureau's chief expert of upper air study, and the Air Service's most expert free air pilot note in actual study while in free flight over the central portion of the United States brought instant good results.

Both men were under thirty years of age and both were possessed of intense enthusiasm in their own particular lines, yet working in unison with only one end in view—their professionalism of meteorology for the benefit of air pilots. Lieutenant Noyes possessed that high degree characteristic of our best air pilots in the Army and Navy, coupled with splendidly trained technical ability. He was also one of the most successful parachute men in the Air Service. Doctor Messinger was unusually well grounded in meteorology and had had the advantage of exceptionally fine association with the leaders in meteorological science.

Noyes and Messinger will never be forgotten and the result of their joint work has enriched our knowledge of the little known regions of the upper air.

From Keyport to Porto Rico and Back

By C J ZIMMERMAN

Chief Test Pilot, Ancon Marine Plane & Motor Co.

On Jan. 15 at 11 a. m. we took off from Keyport harbor, loaded tanks, four passengers and a crew of two to the Aeromarine mail boat *Spang* bound *Morro Castle* N. I. Inside our load of passengers, two crew members, baggage, mail, 20 lb. several sleeping tanks, a box of motor spams weighing 110 lb., two extra Liberty cylinders, a special 40 lb. anchor and our regular 15 lb. folding anchor. A canvas air anchor and two launch slings in slings over our forward and passenger compartments in the event of a forced landing in heavy sea completed our equipment. Inside this load we had in three fuel tanks 170 gal. of gasoline which made our load, including water 3000 lb. in weight. It was a heavy load for a single Liberty motor installed in a flying boat whose weight empty is about 3000 lb., making a total weight of over 6100 lb.

Starting in a Gale

With this load we started out for the Virgin Islands, with no mother ship in attendance or means supporting an emergency other than that we had aboard our ship. Not only do we have a heavy load, but we happened to start in the eye of the worst days of the winter, the day the Shenandoah broke loose from her mooring mast and drifted over Jersey during a southeast gale.

We had no difficulty in getting off, but shortly after reaching *Spang* Hook at an altitude of 400 ft. we began to feel our head wind and noticed that the surf along the Jersey coast was exceptionally rough. We circled past Atlantic City, New York, and at 10:30 a. m. we reached New York Harbor. On Jan. 15, we were barely making headway against the wind and it began to rain, so we decided to turn our motor east and anchor for the night at Ocean City. After indicating our position to the Coast Guard cutter, we anchored and put out both our anchor and riding lights.

On the 17th the weather had cleared, so we proceeded to *Morro*, N. C., about 270 mi. south of Ocean City. Here we replenished our fuel and provisions and gave our passengers an opportunity to see the points of interest during the afternoon. To us who have flown the coast many times, *Morro* is always a stopping point as we are sure of a few headwinds and tail winds, depending on the season.

500 Miles in 5 Hours

On the 18th, we left *Morro* at daylight, intending to make Daytona, Fla., 600 mi. north, that evening. We had no wind, but a stiff breeze from the east and our load took us 8 1/2 hr. to Fernandina, Fla., where we replenished our fuel and mail. Our landing was a half an hour. Proceeding on, we landed at the Daytona Yacht Club at Daytona, having covered 500 mi. in 8 1/2 hr.

The following morning at 8 a. m. we had filed our report and were ready for a long run to Key West, and the fair weather of Florida caused our motor to overhaul in getting off, although we had removed the shutters and desisted the landing from the radiator. Before we had got off the radiator began leaking in five or six places, causing us to go back to the Yacht Club, where we found upon investigation that the relief valve in the radiator (the *Black*) had been screwed down to a point where it was not in the radiator (the *Black*) the valve. Thus the steam formed by overheating had driven out the radiator. Fortunately, we found a good radiator repair station and were able to get the radiator re-built on our boat. Before again attempting to leave we took care to remove the relief valve from the radiator.

The following morning we left Daytona, and landed at Miami 1 1/2 hr. later with a body of tank. We stopped there because we knew we had a 200 lb. motor in a standard 115 lb. boat that would sit on our boat, and replace the standard tank that had been placed along the main, where

it had been welded. Upon arrival in Miami we received a telegram from the factory advising us to await further instructions. For five days we waited in Miami until we received word from the factory that our trip to Miami was cancelled.

On Jan. 25 we left Miami and arrived in Key West 2 1/2 hr. later. Being a conservative crowd, we remained in Key West for three days awaiting word from the factory before we proceeded to Miami, Fla., where we landed in the 20th.

Making the Trip Pay

Before leaving the factory we had agreed to finance the entire trip to Porto Rico and return, paying all expenses and operating expenses by carrying passengers. The factory advanced us \$500 when we left, but by the time we reached Miami our expenses had amounted to \$520 and we were started to work right away.

Our first day in Cuba we succeeded in getting four passengers at 410 each for a ten hour flight over Miami. This money helped, but we were loaded for the next week as we could get more of it coming our way at a later date, as the following day we reduced our price to \$95 a head. The new price proved very popular and within six days we had secured 100 passengers to sail the factory ship, which covered the money advanced to us and our salaries a few weeks in advance. Besides this we had a most working record on land as a reserve fund.

An afternoon later we were told we were to leave the north end of Cuba shipping at all the principal ports for a period of three days to a week depending on the amount of business. We were on the north coast of Cuba from Jan. 28 to March 1, carrying passengers in all kinds of weather from all kinds of harbors. In some places we operated in open ports where the sea was rough, yet we handled these passengers at a time and had no trouble whatsoever with our boat. As a result of our trip we received a building and we ordered one crew made of house plate from the factory, but while waiting for these tanks we continued to operate with only one of our upper tanks. Before leaving Cuba we received a letter from the factory stating that we were to be paid for our trip, and we also changed a leaky cylinder.

On March 4, after taking on a full load of fuel, consisting of 410 gal. of gasoline and 15 gal. of oil, we left Cuba for the north coast of Cuba, where we landed at Cienfuegos, where we were to be paid for our trip, and we also changed a leaky cylinder.

An Unscheduled Event

Just before reaching this lake, while cruising far along the north coast of Porto Rico and during against darkness, a shortage of fuel stopped our motor, causing a 100 lb. motor in a standard 115 lb. boat that would sit on our boat, and replace the standard tank that had been placed along the main, where it had been welded. Upon arrival in Miami we received a telegram from the factory advising us to await further instructions. For five days we waited in Miami until we received word from the factory that our trip to Miami was cancelled.

The following morning we left Miami and arrived in Key West 2 1/2 hr. later. Being a conservative crowd, we remained in Key West for three days awaiting word from the factory before we proceeded to Miami, Fla., where we landed in the 20th.

Jan. 25, 1928

AVIATION

667

was at different levels on the island and making frequent stops to Calhoun, where the Atlantic Fleet was assembled for water maneuvers.

Barnacles and Oysters

On April 2, after the boat had left Key West and the load had been in the water since Jan. 25, we found a detour to Key West for a general overhauling and motor changes. We found that only barnacles on the bottom of the boat, but a quantity of oyster shells and oysters had been found on the bottom of the boat and the hull was covered with a coating of oyster shells and oyster shells. We found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

After overhauling the boat we decided to continue our journey, leaving the boat on the island until we had given the boat a general overhauling.



The Aeromarine mail boat *Spang* bound *Morro Castle* N. I., which C J Zimmerman piloted from New York to Porto Rico and back.

After a brief stop at Key West, we left for Miami, where we landed at 10:30 a. m. We found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

After a brief stop at Key West, we left for Miami, where we landed at 10:30 a. m. We found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

After a brief stop at Key West, we left for Miami, where we landed at 10:30 a. m. We found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

A Long Hop

At 6 o'clock on the 20th, we left Miami in a standard 115 lb. boat that would sit on our boat, and replace the standard tank that had been placed along the main, where it had been welded. Upon arrival in Miami we received a telegram from the factory advising us to await further instructions. For five days we waited in Miami until we received word from the factory that our trip to Miami was cancelled.

On the 20th we again got an early start and made *Morro* for breakfast at 8:15 a. m. As the wind was blowing strong from the southeast and we had sailed the factory the night before, we were able to make *Morro* in 10 hours. We found that the boat was in a very bad state of repair and a general overhauling was needed.

On the 20th we again got an early start and made *Morro* for breakfast at 8:15 a. m. As the wind was blowing strong from the southeast and we had sailed the factory the night before, we were able to make *Morro* in 10 hours. We found that the boat was in a very bad state of repair and a general overhauling was needed.

The Home Run

Shortly after leaving *Morro*, upon taking observations on shore, we found that we were making a little over 110 mi. per hour, we were able to make *Morro* in 10 hours. We found that the boat was in a very bad state of repair and a general overhauling was needed.

After a brief stop at Key West, we left for Miami, where we landed at 10:30 a. m. We found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

After a brief stop at Key West, we left for Miami, where we landed at 10:30 a. m. We found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

Argentine World Flight

The round the world flight planned by Mrs. Helen Egan, the Argentine woman who was accompanied by her husband, the Argentine man, was to be made in a standard 115 lb. boat that would sit on our boat, and replace the standard tank that had been placed along the main, where it had been welded. Upon arrival in Miami we received a telegram from the factory advising us to await further instructions. For five days we waited in Miami until we received word from the factory that our trip to Miami was cancelled.

The Argentine woman who was accompanied by her husband, the Argentine man, was to be made in a standard 115 lb. boat that would sit on our boat, and replace the standard tank that had been placed along the main, where it had been welded. Upon arrival in Miami we received a telegram from the factory advising us to await further instructions. For five days we waited in Miami until we received word from the factory that our trip to Miami was cancelled.

Roth Law and the Helicopter

Roth Law, who was in New York in 1921 after many voyages, arrived in New York in 1921 after many voyages. He found that the boat was in a very bad state of repair and a general overhauling was needed. We found that the boat was in a very bad state of repair and a general overhauling was needed.

Aviation in Congress AIR MAIL APPROPRIATIONS

Mark 7, Senate

The Treasury and Post Office Departments Appropriation Bill (H. R. 5049) with amendments passed the Senate, including the amendments for air mail service as follows: **Amendment 43**—For the operation and maintenance of the airplane mail service between New York, N. Y., and San Francisco, Calif., on Chicago, Ill., and Omaha, Neb., including incidental expenses and employment of necessary personnel, \$1,500,000.

Amendment 44—For an additional amount for the construction, equipment and operation of the airplane mail service by night, day and to enable this department to make the additional charges for both night and day service as first-class mail matter, in accordance with existing law, \$1,500,000. The bill with amendments was returned to the House.

Mark 8, House

Mr. Madden asked unanimous consent that the bill (H. R. 5049) be returned by the Senate be taken from the Speaker's table, the Senate amendments disagreed to, and the bill sent to conference. This was done.

Mark 9, Senate

The President's Office bill before the Senate the action of the House of Representatives disagreeing to the amendments of the Senate to the bill (H. R. 5049), and requesting a conference with the Senate on the disagreeing votes of the two Houses. Thereafter, Mr. Warren moved that the Senate accept the amendments, that it accept the resolution of the House for the appointment of conferees, and that the President's Office appear the conference on the part of the Senate. The motion was carried by yeas 19, nays 1. Mr. Warren and Mr. Glass conferees on the part of the Senate. Mr. Madden, Mr. Vane and Mr. Payne of Tennessee were appointed conferees on the part of the House.

Mark 10

The recommendations of the Conference Committee on the disagreeing votes of the two Houses on the amendments of the Senate to the bill (H. R. 5049) were reported to the Senate and the House. The Committee of Conference had not agreed on amendments numbered 1, 2, 43 and 44. The report with these exceptions was agreed to in the Senate.

Mark 11, House

Mr. Madden called up the report of the Conference Committee on the bill (H. R. 5049). The House agreed from its disagreement to Senate amendments numbered 1, 2, 43 and 44. The report with these exceptions was agreed to in the Senate. The report with these exceptions was agreed to in the Senate.

Mark 12, Senate

The Chair laid before the Senate the action of the House on the Conference Report. Mr. Warren moved that the Senate agree to the amendments of the House to the amendments of the Senate Nos. 1 and 44. This motion was agreed to.

ARMY AIR APPROPRIATION

Mark 13, House

Mr. Anderson, A. H. (H. R. 7677) asking appropriation for the military and non-military services of the War Department for the fiscal year ending June 30, 1935, and for other purposes, Committee on Committee of Whole House on the whole of the House.

Mark 14, Senate

After discussion and debate the bill (H. R. 7677) with amendments passed the House.

Mark 15, Senate

The bill (H. R. 7677) was referred to the Senate Committee on Appropriations.

Mark 16, House

The House received itself into the Committee of the Whole

House on the state of the Union and proceeded to consider the Navy Department Appropriation Bill (H. R. 6820).

Mark 17

The two provisions in the paragraph on the Bureau of Aeronautics were not on a point of order because of new legislation contained therein. The following amendments were immediately reported by Mr. French: The bill (H. R. 6820), after the word "Provided" strike out the word "in the" and insert the word "and".

The Chairman of the Whole House on the state of the Union reported that the Committee, having under consideration the bill (H. R. 6820) making appropriations for the Navy Department and the Naval Service for the fiscal year ending June 30, 1935, and for other purposes, had agreed to report the same back with certain amendments, and the bill as amended was agreed to be reported and read a third time, and was read a third time. Mr. Blanton filed a motion to recommit the bill to the Committee on Appropriations with instructions to report the same back to the House with certain amendments. The vote on the motion to commit was held over until the following morning.

Mark 18

Mr. Madden's motion was rejected. The bill (H. R. 6820) was passed by the House.

Mark 19

The Navy Appropriation Bill (H. R. 6820) was referred to the Senate Committee on Appropriations.

Mark 20

The bill (H. R. 6820) was reported back with amendments from the Committee on Appropriations and placed on the calendar.

Mark 21, House

House Resolution 102, to appoint a committee to inquire into the operations of the U. S. Army Air Service, U. S. Naval Service of Aeronautics and the U. S. Air Mail Service (Legislative Bulletin No. 37) was debated and passed the House with an amendment to increase the number of the Committee from seven to nine.

Mark 22, Senate

Mr. Trimmer A resolution (S. Res. 347) requesting the President to call a conference of representatives to consider necessary adjustments and further legislation of aircraft, particularly of subsonic and supersonic.

Referred to the Committee on Foreign Affairs.

Mark 23, Senate

Mr. French A resolution (S. Res. 348) advising the President that in the judgment of the Senate a model conference is appropriate to consider further legislation in use, land and air aircraft, and for a World Court.

Referred to the Committee on Foreign Relations.

Mark 24, House

The Committee on Post Office and Public Roads reported the bill (H. R. 3285) (see Legislative Bulletin No. 15) back with amendments.

Referred to Committee of the Whole House on the state of the Union.

—Continued on Column 2—

Free Flight Propeller Tests NACA Report 163

This paper, by Max M. Munk, prepared for publication by the National Advisory Committee for Aeronautics, contains the description of a new and useful method suitable for the design of propellers and for the interpretation of test results.

The velocity diagram velocity computed from the described horsepower is plotted against the velocity slip velocity V is discussed in detail how this velocity is obtained. The method used in the test is described in detail by applying them to model tests and in free flight tests with actual propellers.

A copy of Report No. 163 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

LIGHT PLANES AND GLIDERS

Edited by Edmund T. Allen

The A4 Light Plane

(Continued from last page)

In general, considerations looking toward the least labor, the lightest structural weight, and the maximum efficiency, later used the layout of the A4. Therefore the monoplane type is partly because it is structurally the simpler, roomiest and itself. Semi-cantilever struts serve further to cut down structural weight, to provide for shock dissipation, to act as a simple heavy structural members oriented across the front of it (cabin)—members that are of danger in a crash. The wing ribs at the top of the fuselage rather than at the bottom for two reasons: One position maintains aerodynamic efficiency at great better ability, contrary to a popular tradition, near the position of the wing and it gives greater wing drive on such occasions as that of a forced landing in high winds or bank.

The plan of the wing derives from two factors—maximum efficiency (in this case—maximum distance on maximum fuel) and maximum aspect ratio, without a consequent increase in the structural weight alone. A "reasonable amount" in view of the moment of the tapered wing of the A4 light plane at 15 mph will fall, on any basis of tapered wings give any appreciable increase in aerodynamic efficiency. A comparison of the plan form of the "Vee" and "Vee" may give additional position to those who believe in straight wings.

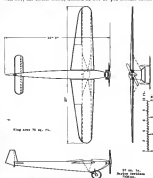
Consequently, the tapered wing, across the fuselage and again to disturb the air flow at the middle, would give much better efficiency. It is, however, doubtful if the tip issues are more than the fuselage interference based on most machines. The design confusion would be, therefore, to place a large proportion of the wing surface as possible as far as possible away from the fuselage, and the fuselage interference based on the wing surface, it was actually tried on a French man, the Gordon-Lennox, and the results of the race moved to justify the greatest hopes of the designers. Since there is no such doubt about, that actually appears to be the case in each particular case, an improved scale is used to give additional aspect ratio credit to tapered wings.

And this limits increase in aspect ratio to almost directly proportional to increase in L/D. It seems doubtful if it is more than 1.2/D of aspect ratio above 15 was worth the increase in weight, and 0.5% was chosen. Choosing a wing loading of 5 lb./sq. ft., the wing dimensions came out as follows: span 20 sq. ft., span 22 ft., maximum chord 50 in., minimum chord 30 in.

Preliminary performance calculations gave the key to the wing loading. The limiting factor was a maximum climb rate of at least 200 ft. per minute at no load. Assuming 75 hp and 60 per cent propeller efficiency, the wing loading at the propeller. On the basis of assumptions of power drag and of the data on the wing, 3 hp. is required for normal flight, leaving 5 hp. for climbing at the necessary wing loading.

It is impossible here to go into detailed performance calculations. That must be, after all, the central feature of all airplane design. The foregoing estimate of climb is in the nature of a rough guide. The National Advisory Committee for Aeronautics (1334) Navy Building, Washington, D. C. has published a report on performance calculation, written by Gustav Davidson, giving formulas for loading speed, speed range, climb, stall climb, and other factors. These factors are applied to various machines now in use, and they are very simple for such machines. Whether or not they can be extended into the range of power loading covering light planes is very doubtful. An attempt was made on loads of 50 lbs. on the climb at the Stevens-Henrichs Paper Flight plane with a power loading of 100 lb./hp with the result of an

ascent. The great difficulty is that our estimate of L/D for light planes are of the most variable character. The L/D of the A4 was estimated at 12. If it is as low as 8 (which may well be), the initial climb, instead of 200 ft. per minute comes



Outline drawing of the Allen A4 light plane

only 80 ft. per minute. If the L/D is 15 (which is very doubtful), the climb may be as high as 200 ft. per minute.

The formula for stalling speed (in mph) is as follows:

$$V_s = 10.5 \sqrt{\frac{W}{S}} \quad \text{Wing Loading}$$

$$V_s = 10.5 \sqrt{\frac{W}{S}} \quad \text{Max. Lift Coefficient}$$

The speed range is given by the formula:

$$V_s = 10.5 \sqrt{\frac{W}{S}} \quad \text{25.3 ft.}^2$$

$$V_s = 10.5 \sqrt{\frac{W}{S}} \quad \text{Power loading}$$

where η is the propeller efficiency.

Initial climb,

$$C = 33,000 \left(\frac{W}{S} \right) \left(\frac{1}{V_s} \right) \quad \text{2125 (ft.}^2 \text{)} \quad \text{2125 (ft.}^2 \text{)}$$

is in feet per minute. K has a value from 0.6 to 0.8 for speed ranges of from 2.2 to 1.5, the most probable range for light planes. The wing loading was made on the basis of a careful preliminary analysis of the weights of the component parts. This analysis came out as follows:

- 74 14 inch long, welding tank and controls.
- 86 10 engine
- 87 10 propeller
- 88 10 tank and accessories
- 89 10 wing (30 ft. span, 18 ft. chord and bearing, 20 ft. (control, 4 ft. for aileron and struts)
- 90 10 landing gear
- 91 10 tail machine
- 92 10 tail

- 217 10 not worked
- 222 10 pilot
- 230 10 fuel

212 10 engine works

A total weight of 244 lb. was set on the goal and a mere minor factor of safety of 10 was adopted. It is to be noted that the goal of 180 lb. goes, which may be the lightest airplane built. It must, of course, have to be increased if the machine was intended to fly faster than its designer, who happens, fortunately, to be a lightweight.

On the basis of the calculations, the landing speed is 36.4 m./hr., somewhat higher than the average light plane landing speed, but more satisfactory than what is known as a fighter.

The unusually long fuselage means safety in roller control, and it demands insignificant decrease. It also permits of smaller control surfaces in the tail group. It also permits the fuselage to be rectangular for simplicity in construction. The landing gear, a welded steel tube tapered as built up, with the shock absorber built in the fuselage. One disadvantage of the semi-rigid type used on some of the English light planes is practically, especially for cross country work.

The engine mounting requires the least. Its simplicity is remarkable, the little Blumley being bolted onto the front of the fuselage where the four hinges come into a small ballhead. As the valves, the cylinder present slightly, and the muffler extends below the engine, but these will not seriously decrease the parasite resistance of the fuselage if the covering is well fitted.

It was difficult in designing to obtain the balance properly. With the pilot positioned, such a large percentage of the gross weight, and where it was distributed, because there was space, so that when his position is moved forward or forward it is necessary also to move the engine, there is an ever-existing problem. It is, however, suggested very early in the design process to obtain a satisfactory balance, for important structural changes may be necessary if that is not done. It is an airplane built recently for the government, the center of gravity was only 10 to 12,000 in. pounds too far to the rear where the machine was weighed up preliminary to its test flight. It required a large weight in the nose of the fuselage to balance the ship so that it would be safe to fly.

(To be continued)

Current Comments

What has happened to all the glider enthusiasts in America? So far as is known at present, plans for air racing competitions are inadequately advanced because there are no funds available for prize money of the glider builders transferred their interest to light planes. Others are waiting for the return of the "glider man" when they will have their opportunity to ride on the wind.

In Germany the problem was solved by holding the same prizes for both gliders and "antiplanes" together. For with their little secondary waters, the German gliders can hardly be called light planes, in spite of their rather spectacular performances.

The 1934 Schneider Cup competition began on Aug. 25, and lasts until the 28th. The rules and prizes are printed in full in the April issue of *Five Leaflets*.

Heralded as the "Pork of the Air," the Detroit-Goblet monoplane has aroused great popular interest in Germany. It is, however, distinctly out of the light plane class and can be given but a word here.

The motor used in the Heinkel two-seater opened type rated at 65-70 hp. This gives a power loading of 11 lb./hp. with a max. loading of 6.5 lb./hp. (1)

Light planes have been described on experiments in high power loading. The average power loading of the English light planes was about 20 lb./hp., with one of them going as high as 100 lb./hp. An old glider was once burnt to a cinder. "Anything will fly if you give it a few enough power loadings."

Ferdinand Schiele, a German glider pilot, established a new duration record for gliders, during competitive flights at the Reichen, East Prussia, on May 31. Schiele was in the air 4 hr. 42 min. and maintained an average altitude of 150 ft. As Germany has not yet been mentioned in the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 152nd, 153rd, 154th, 155th, 156th, 157th, 158th, 159th, 160th, 161st, 162nd, 163rd, 164th, 165th, 166th, 167th, 168th, 169th, 170th, 171st, 172nd, 173rd, 174th, 175th, 176th, 177th, 178th, 179th, 180th, 181st, 182nd, 183rd, 184th, 185th, 186th, 187th, 188th, 189th, 190th, 191st, 192nd, 193rd, 194th, 195th, 196th, 197th, 198th, 199th, 200th, 201st, 202nd, 203rd, 204th, 205th, 206th, 207th, 208th, 209th, 210th, 211st, 212nd, 213th, 214th, 215th, 216th, 217th, 218th, 219th, 220th, 221st, 222nd, 223rd, 224th, 225th, 226th, 227th, 228th, 229th, 230th, 231st, 232nd, 233rd, 234th, 235th, 236th, 237th, 238th, 239th, 240th, 241st, 242nd, 243rd, 244th, 245th, 246th, 247th, 248th, 249th, 250th, 251st, 252nd, 253rd, 254th, 255th, 256th, 257th, 258th, 259th, 260th, 261st, 262nd, 263rd, 264th, 265th, 266th, 267th, 268th, 269th, 270th, 271st, 272nd, 273rd, 274th, 275th, 276th, 277th, 278th, 279th, 280th, 281st, 282nd, 283rd, 284th, 285th, 286th, 287th, 288th, 289th, 290th, 291st, 292nd, 293rd, 294th, 295th, 296th, 297th, 298th, 299th, 300th, 301st, 302nd, 303rd, 304th, 305th, 306th, 307th, 308th, 309th, 310th, 311st, 312nd, 313th, 314th, 315th, 316th, 317th, 318th, 319th, 320th, 321st, 322nd, 323rd, 324th, 325th, 326th, 327th, 328th, 329th, 330th, 331st, 332nd, 333rd, 334th, 335th, 336th, 337th, 338th, 339th, 340th, 341st, 342nd, 343rd, 344th, 345th, 346th, 347th, 348th, 349th, 350th, 351st, 352nd, 353rd, 354th, 355th, 356th, 357th, 358th, 359th, 360th, 361st, 362nd, 363rd, 364th, 365th, 366th, 367th, 368th, 369th, 370th, 371st, 372nd, 373rd, 374th, 375th, 376th, 377th, 378th, 379th, 380th, 381st, 382nd, 383rd, 384th, 385th, 386th, 387th, 388th, 389th, 390th, 391st, 392nd, 393rd, 394th, 395th, 396th, 397th, 398th, 399th, 400th, 401st, 402nd, 403rd, 404th, 405th, 406th, 407th, 408th, 409th, 410th, 411st, 412nd, 413th, 414th, 415th, 416th, 417th, 418th, 419th, 420th, 421st, 422nd, 423rd, 424th, 425th, 426th, 427th, 428th, 429th, 430th, 431st, 432nd, 433rd, 434th, 435th, 436th, 437th, 438th, 439th, 440th, 441st, 442nd, 443rd, 444th, 445th, 446th, 447th, 448th, 449th, 450th, 451st, 452nd, 453rd, 454th, 455th, 456th, 457th, 458th, 459th, 460th, 461st, 462nd, 463rd, 464th, 465th, 466th, 467th, 468th, 469th, 470th, 471st, 472nd, 473rd, 474th, 475th, 476th, 477th, 478th, 479th, 480th, 481st, 482nd, 483rd, 484th, 485th, 486th, 487th, 488th, 489th, 490th, 491st, 492nd, 493rd, 494th, 495th, 496th, 497th, 498th, 499th, 500th, 501st, 502nd, 503rd, 504th, 505th, 506th, 507th, 508th, 509th, 510th, 511st, 512nd, 513th, 514th, 515th, 516th, 517th, 518th, 519th, 520th, 521st, 522nd, 523rd, 524th, 525th, 526th, 527th, 528th, 529th, 530th, 531st, 532nd, 533rd, 534th, 535th, 536th, 537th, 538th, 539th, 540th, 541st, 542nd, 543rd, 544th, 545th, 546th, 547th, 548th, 549th, 550th, 551st, 552nd, 553rd, 554th, 555th, 556th, 557th, 558th, 559th, 560th, 561st, 562nd, 563rd, 564th, 565th, 566th, 567th, 568th, 569th, 570th, 571st, 572nd, 573rd, 574th, 575th, 576th, 577th, 578th, 579th, 580th, 581st, 582nd, 583rd, 584th, 585th, 586th, 587th, 588th, 589th, 590th, 591st, 592nd, 593rd, 594th, 595th, 596th, 597th, 598th, 599th, 600th, 601st, 602nd, 603rd, 604th, 605th, 606th, 607th, 608th, 609th, 610th, 611st, 612nd, 613th, 614th, 615th, 616th, 617th, 618th, 619th, 620th, 621st, 622nd, 623rd, 624th, 625th, 626th, 627th, 628th, 629th, 630th, 631st, 632nd, 633rd, 634th, 635th, 636th, 637th, 638th, 639th, 640th, 641st, 642nd, 643rd, 644th, 645th, 646th, 647th, 648th, 649th, 650th, 651st, 652nd, 653rd, 654th, 655th, 656th, 657th, 658th, 659th, 660th, 661st, 662nd, 663rd, 664th, 665th, 666th, 667th, 668th, 669th, 670th, 671st, 672nd, 673rd, 674th, 675th, 676th, 677th, 678th, 679th, 680th, 681st, 682nd, 683rd, 684th, 685th, 686th, 687th, 688th, 689th, 690th, 691st, 692nd, 693rd, 694th, 695th, 696th, 697th, 698th, 699th, 700th, 701st, 702nd, 703rd, 704th, 705th, 706th, 707th, 708th, 709th, 710th, 711st, 712nd, 713th, 714th, 715th, 716th, 717th, 718th, 719th, 720th, 721st, 722nd, 723rd, 724th, 725th, 726th, 727th, 728th, 729th, 730th, 731st, 732nd, 733rd, 734th, 735th, 736th, 737th, 738th, 739th, 740th, 741st, 742nd, 743rd, 744th, 745th, 746th, 747th, 748th, 749th, 750th, 751st, 752nd, 753rd, 754th, 755th, 756th, 757th, 758th, 759th, 760th, 761st, 762nd, 763rd, 764th, 765th, 766th, 767th, 768th, 769th, 770th, 771st, 772nd, 773rd, 774th, 775th, 776th, 777th, 778th, 779th, 780th, 781st, 782nd, 783rd, 784th, 785th, 786th, 787th, 788th, 789th, 790th, 791st, 792nd, 793rd, 794th, 795th, 796th, 797th, 798th, 799th, 800th, 801st, 802nd, 803rd, 804th, 805th, 806th, 807th, 808th, 809th, 810th, 811st, 812nd, 813th, 814th, 815th, 816th, 817th, 818th, 819th, 820th, 821st, 822nd, 823rd, 824th, 825th, 826th, 827th, 828th, 829th, 830th, 831st, 832nd, 833rd, 834th, 835th, 836th, 837th, 838th, 839th, 840th, 841st, 842nd, 843rd, 844th, 845th, 846th, 847th, 848th, 849th, 850th, 851st, 852nd, 853rd, 854th, 855th, 856th, 857th, 858th, 859th, 860th, 861st, 862nd, 863rd, 864th, 865th, 866th, 867th, 868th, 869th, 870th, 871st, 872nd, 873rd, 874th, 875th, 876th, 877th, 878th, 879th, 880th, 881st, 882nd, 883rd, 884th, 885th, 886th, 887th, 888th, 889th, 890th, 891st, 892nd, 893rd, 894th, 895th, 896th, 897th, 898th, 899th, 900th, 901st, 902nd, 903rd, 904th, 905th, 906th, 907th, 908th, 909th, 910th, 911st, 912nd, 913th, 914th, 915th, 916th, 917th, 918th, 919th, 920th, 921st, 922nd, 923rd, 924th, 925th, 926th, 927th, 928th, 929th, 930th, 931st, 932nd, 933rd, 934th, 935th, 936th, 937th, 938th, 939th, 940th, 941st, 942nd, 943rd, 944th, 945th, 946th, 947th, 948th, 949th, 950th, 951st, 952nd, 953rd, 954th, 955th, 956th, 957th, 958th, 959th, 960th, 961st, 962nd, 963rd, 964th, 965th, 966th, 967th, 968th, 969th, 970th, 971st, 972nd, 973rd, 974th, 975th, 976th, 977th, 978th, 979th, 980th, 981st, 982nd, 983rd, 984th, 985th, 986th, 987th, 988th, 989th, 990th, 991st, 992nd, 993rd, 994th, 995th, 996th, 997th, 998th, 999th, 1000th, 1001st, 1002nd, 1003rd, 1004th, 1005th, 1006th, 1007th, 1008th, 1009th, 1010th, 1011st, 1012nd, 1013th, 1014th, 1015th, 1016th, 1017th, 1018th, 1019th, 1020th, 1021st, 1022nd, 1023rd, 1024th, 1025th, 1026th, 1027th, 1028th, 1029th, 1030th, 1031st, 1032nd, 1033rd, 1034th, 1035th, 1036th, 1037th, 1038th, 1039th, 1040th, 1041st, 1042nd, 1043rd, 1044th, 1045th, 1046th, 1047th, 1048th, 1049th, 1050th, 1051st, 1052nd, 1053rd, 1054th, 1055th, 1056th, 1057th, 1058th, 1059th, 1060th, 1061st, 1062nd, 1063rd, 1064th, 1065th, 1066th, 1067th, 1068th, 1069th, 1070th, 1071st, 1072nd, 1073rd, 1074th, 1075th, 1076th, 1077th, 1078th, 1079th, 1080th, 1081st, 1082nd, 1083rd, 1084th, 1085th, 1086th, 1087th, 1088th, 1089th, 1090th, 1091st, 1092nd, 1093rd, 1094th, 1095th, 1096th, 1097th, 1098th, 1099th, 1100th, 1101st, 1102nd, 1103rd, 1104th, 1105th, 1106th, 1107th, 1108th, 1109th, 1110th, 1111st, 1112nd, 1113th, 1114th, 1115th, 1116th, 1117th, 1118th, 1119th, 1120th, 1121st, 1122nd, 1123rd, 1124th, 1125th, 1126th, 1127th, 1128th, 1129th, 1130th, 1131st, 1132nd, 1133rd, 1134th, 1135th, 1136th, 1137th, 1138th, 1139th, 1140th, 1141st, 1142nd, 1143rd, 1144th, 1145th, 1146th, 1147th, 1148th, 1149th, 1150th, 1151st, 1152nd, 1153rd, 1154th, 1155th, 1156th, 1157th, 1158th, 1159th, 1160th, 1161st, 1162nd, 1163rd, 1164th, 1165th, 1166th, 1167th, 1168th, 1169th, 1170th, 1171st, 1172nd, 1173rd, 1174th, 1175th, 1176th, 1177th, 1178th, 1179th, 1180th, 1181st, 1182nd, 1183rd, 1184th, 1185th, 1186th, 1187th, 1188th, 1189th, 1190th, 1191st, 1192nd, 1193rd, 1194th, 1195th, 1196th, 1197th, 1198th, 1199th, 1200th, 1201st, 1202nd, 1203rd, 1204th, 1205th, 1206th, 1207th, 1208th, 1209th, 1210th, 1211st, 1212nd, 1213th, 1214th, 1215th, 1216th, 1217th, 1218th, 1219th, 1220th, 1221st, 1222nd, 1223rd, 1224th, 1225th, 1226th, 1227th, 1228th, 1229th, 1230th, 1231st, 1232nd, 1233rd, 1234th, 1235th, 1236th, 1237th, 1238th, 1239th, 1240th, 1241st, 1242nd, 1243rd, 1244th, 1245th, 1246th, 1247th, 1248th, 1249th, 1250th, 1251st, 1252nd, 1253rd, 1254th, 1255th, 1256th, 1257th, 1258th, 1259th, 1260th, 1261st, 1262nd, 1263rd, 1264th, 1265th, 1266th, 1267th, 1268th, 1269th, 1270th, 1271st, 1272nd, 1273rd, 1274th, 1275th, 1276th, 1277th, 1278th, 1279th, 1280th, 1281st, 1282nd, 1283rd, 1284th, 1285th, 1286th, 1287th, 1288th, 1289th, 1290th, 1291st, 1292nd, 1293rd, 1294th, 1295th, 1296th, 1297th, 1298th, 1299th, 1300th, 1301st, 1302nd, 1303rd, 1304th, 1305th, 1306th, 1307th, 1308th, 1309th, 1310th, 1311st, 1312nd, 1313th, 1314th, 1315th, 1316th, 1317th, 1318th, 1319th, 1320th, 1321st, 1322nd, 1323rd, 1324th, 1325th, 1326th, 1327th, 1328th, 1329th, 1330th, 1331st, 1332nd, 1333rd, 1334th, 1335th, 1336th, 1337th, 1338th, 1339th, 1340th, 1341st, 1342nd, 1343rd, 1344th, 1345th, 1346th, 1347th, 1348th, 1349th, 1350th, 1351st, 1352nd, 1353rd, 1354th, 1355th, 1356th, 1357th, 1358th, 1359th, 1360th, 1361st, 1362nd, 1363rd, 1364th, 1365th, 1366th, 1367th, 1368th, 1369th, 1370th, 1371st, 1372nd, 1373rd, 1374th, 1375th, 1376th, 1377th, 1378th, 1379th, 1380th, 1381st, 1382nd, 1383rd, 1384th, 1385th, 1386th, 1387th, 1388th, 1389th, 1390th, 1391st, 1392nd, 1393rd, 1394th, 1395th, 1396th, 1397th, 1398th, 1399th, 1400th, 1401st, 1402nd, 1403rd, 1404th, 1405th, 1406th, 1407th, 1408th, 1409th, 1410th, 1411st, 1412nd, 1413th, 1414th, 1415th, 1416th, 1417th, 1418th, 1419th, 1420th, 1421st, 1422nd, 1423rd, 1424th, 1425th, 1426th, 1427th, 1428th, 1429th, 1430th, 1431st, 1432nd, 1433rd, 1434th, 1435th, 1436th, 1437th, 1438th, 1439th, 1440th, 1441st, 1442nd, 1443rd, 1444th, 1445th, 1446th, 1447th, 1448th, 1449th, 1450th, 1451st, 1452nd, 1453rd, 1454th, 1455th, 1456th, 1457th, 1458th, 1459th, 1460th, 1461st, 1462nd, 1463rd, 1464th, 1465th, 1466th, 1467th, 1468th, 1469th, 1470th, 1471st, 1472nd, 1473rd, 1474th, 1475th, 1476th, 1477th, 1478th, 1479th, 1480th, 1481st, 1482nd, 1483rd, 1484th, 1485th, 1486th, 1487th, 1488th, 1489th, 1490th, 1491st, 1492nd, 1493rd, 1494th, 1495th, 1496th, 1497th, 1498th, 1499th, 1500th, 1501st, 1502nd, 1503rd, 1504th, 1505th, 1506th, 1507th, 1508th, 1509th, 1510th, 1511st, 1512nd, 1513th, 1514th, 1515th, 1516th, 1517th, 1518th, 1519th, 1520th, 1521st, 1522nd, 1523rd, 1524th, 1525th, 1526th, 1527th, 1528th, 1529th, 1530th, 1531st, 1532nd, 1533rd, 1534th, 1535th, 1536th, 1537th, 1538th, 1539th, 1540th, 1541st, 1542nd, 1543rd, 1544th, 1545th, 1546th, 1547th, 1548th, 1549th, 1550th, 1551st, 1552nd, 1553rd, 1554th, 1555th, 1556th, 1557th, 1558th, 1559th, 1560th, 1561st, 1562nd, 1563rd, 1564th, 1565th, 1566th, 1567th, 1568th, 1569th, 1570th, 1571st, 1572nd, 1573rd, 1574th, 1575th, 1576th, 1577th, 1578th, 1579th, 1580th, 1581st, 1582nd, 1583rd, 1584th, 1585th, 1586th, 1587th, 1588th, 1589th, 1590th, 1591st, 1592nd, 1593rd, 1594th, 1595th, 1596th, 1597th, 1598th, 1599th, 1600th, 1601st, 1602nd, 1603rd, 1604th, 1605th, 1606th, 1607th, 1608th, 1609th, 1610th, 1611st, 1612nd, 1613th, 1614th, 1615th, 1616th, 1617th, 1618th, 1619th, 1620th, 1621st, 1622nd, 1623rd, 1624th, 1625th, 1626th, 1627th, 1628th, 1629th, 1630th, 1631st, 1632nd, 1633rd, 1634th, 1635th, 1636th, 1637th, 1638th, 1639th, 1640th, 1641st, 1642nd, 1643rd, 1644th, 1645th, 1646th, 1647th, 1648th, 1649th, 1650th, 1651st, 1652nd, 1653rd, 1654th, 1655th, 1656th, 1657th, 1658th, 1659th, 1660th, 1661st, 1662nd, 1663rd, 1664th, 1665th, 1666th, 1667th, 1668th, 1669th, 1670th, 1671st, 1672nd, 1673rd, 1674th, 1675th, 1676th, 1677th, 1678th, 1679th,

Model of Mail Airway Shown

A wonderfully realistic scale model of the transcontinental airway of the Air Mail Service is on exhibition in Times Building, New York, where it attracts great crowds. The model consists of a cabinet, 21 ft. long, which contains a map of the United States showing in contrasting colors the day and night flight divisions of the Air Mail. Over this map, twelve two-bay, three-deck models of standard airplane, shown as they look in flight, are suspended. The planes are exact models of the standard DC biplane planes



Helicopter built by the Chicago Helicopter, Ltd., William F. Stout, the inventor, is in the pilot's seat.

used in the Air Mail Service. One plane starts from New York at the same time the other leaves San Francisco. They move slowly toward each other, bright lights showing they started at the same time of early morning. When the westbound plane approaches Chicago and the eastbound one near Chicago, the lights change indicating the setting of the sun. This is represented by red lamps, and these are superimposed by a blue or twilight light.

To simulate the night, all the lights above the map are turned out, and from beneath it, through pin holes made to represent the constellations to guide the plane, flash the international port of destination lights. These pinholes, about a third of an inch apart, extend all the way from Chicago to Chicago, between which each plane will fly during the night. For the actual thing they have been placed every three miles along the entire route of 385 mi. from Chicago to Chicago.

After Chicago is reached by the westbound plane, and the eastbound plane leaves Chicago, the lights again change showing the gradual transition from night to daylight. Under the cabinet, under the direction of J. E. White, Inc., representative of the Eastern Division of the Air Mail Service, and with the approval of Joseph Johnson, Commissioner of Public Works. It was constructed at the request of Paul Henderson, Special Assistant Postmaster General by the Air Mail Repair Shop, at Maywood, Ill. The purpose of the exhibit is to draw attention to the speed of the Air Mail Service and thus increase its use by individuals and corporations. The Transit Wide World Service has already decided to send its photographs by the Air Mail Service, thereby saving three days in the trip from the East to the West Coast.

Development of British Air Traffic

The remarkable growth in air traffic between the United Kingdom and the Continent is reflected in several figures issued by the Air Ministry. According to the Department of Commerce, showing that by the end of 1932 air transport had carried 48,520 passengers to or from the Continent, British aircraft accounting for 32,532 (75 per cent) of the total. The traffic increased in 1933 compared with the previous year, with a total of 15,570 passengers and over 800

tons of goods as compared with 13,569 passengers and 477 tons of goods in 1932. British airlines carried 79 per cent of the passengers in 1932 and 75 per cent in 1933.

The average load carried in each flight by the British commercial air lines during the year 1932 was 13 or 14 passengers per flight, which is in line with 1933 figures. (It is to be remembered that in 1932 the total number of flights was 1,000 and about 250 in all of 1933. The total of British and foreign airlines that imported and exported amounted to 15,100,000.)

The volume flown in 1933 by British commercial air was 142,000, an increase of 228,000 over the mileage in 1932. The reliability of British air lines was maintained at about the same level in 1933, in spite of the fact that new routes were opened and longer flights made. On the London-New route, the flights completed in 1933 within the time limit set for the subsidy scheme amounted to 92.5 per cent of the total, the corresponding figure for all routes in 1932 was 81 per cent.

A regular daily air mail service was inaugurated in April between Manchester (England) and Berlin (Germany) and has already been extended and proposed to other terminals, and an airplane, operated by the Deutsche Luftverkehrsgesellschaft, is used which is capable of carrying four passengers or 1000 lb. of freight or mail.

It is reported that the Chamber of Commerce of Philadelphia has communicated with the Chamber of Commerce in London, Manchester, Birmingham, Cardiff and Belfast, with a view to holding a conference on the question of establishing a regular air service between these cities. The Chamber in London is said to have made the proposal that in consideration of an aviation company supplying a service to all air routes of these cities, an amount not exceeding £150,000 will be awarded to it. The plan, however, has not as yet been fully developed.

To Photograph Amazon from the Air

A new expedition into the unexplored region of the Amazon River under the command of Dr. Alexander Hamilton Rice is preparing to get underway from Manaus, Brazil. Dr. Rice will use a large steel boat as his operating base, and two flying boats for his aerial survey work. Lieut. Walter Hooten will be in charge of the expedition. Dr. Rice is in charge of aerial photography.

The Fairchild Aerial Camera Corp. has supplied all the apparatus necessary for making a complete aerial survey of the Amazon River. The equipment includes a Fairchild No. 10 aerial camera, a Fairchild No. 10 aerial camera, and a Fairchild No. 10 aerial camera.

Dr. Rice is also taking with him photographic apparatus ordered by the Brazilian Government.

Tests of Airship Girders

Tests to determine the possibility of getting greater strength from a wire-wire weight or girder are being undertaken by the Bureau of Standards. Such girders carry loads in compression or bending or both and their strength depends upon their design, as well as upon the strength of the material. In the tests conducted by the Bureau of Standards, the strength of the girder is tested by applying a load of only 30,000 lb. per square inch of the metal, whereas the metal itself will not yield under a compression of over 100,000 lb. per square inch. It is thought that better design, resulting in making all parts equally strong, may result in the strength of the girder approaching more nearly the strength of the metal. Such a result would be of great importance, as it would be necessary to make joints and girder parts of various prevailing designs and test them for strength.

A Close Escape

A airplane piloted by Edmund Kendall of North Sydney and carrying Warren Robinson as a passenger started out to engine trouble and plunged into Lake Quanaquana, 7 1/2 miles from Sydney, on June 15, at 10 o'clock in the morning. The plane was a biplane, and the pilot was killed.

Kendall and Robinson escaped serious injury by 1/2 mile from the lake before the machine struck the water. They were rescued by a row boat.

Australian Air Mail Services

During 1933, Australia's two air mail services functioned with considerable regularity and so small amounts of income, say, aircraft, the only Australian airmail service which was not just being maintained by an office and proprietor, but by a government.

In the 1933 air mail service from Melbourne to Perth, in Western Australia, the contractor's schedule was 200,000 miles. Approximately 500 passengers were carried, while the monthly mail bag averaged some 12,000 letters. The air mail has now been extended south to Perth. By the end of 1933, the average passenger from 17 to 25 lbs. in the air mail is referred to 750 mi., or about 3 lb. flight. The service of the mail was inaugurated on Jan. 1, 1933, as a result of the subsidy has been approved by the Australian government.



Press Wire World

The Focke D-12 airplane in which Commander Cable and Lieutenant McIntyre successfully flew across Australia in 44 days.

Indian government for a further term of three years, ending on Dec. 31, 1936.

In the northern end of this survey an extension of 500 mi. from Delhi to Myittha, will be completed by September or October, 1933. This will then make the Western Australian survey the longest continuous mail and passenger air line in the world, the length of which will only be exceeded in New York to San Francisco survey of the U. S. Air Mail Service (2,000 mi.).

The other Australian survey, operated between Adelaide and Melbourne (1,000 mi.) by the Queensland & Western Australia Aerial Service, Ltd., has completed all initial flights, established a highly commendable record during its first year, which ended Jan. 1, 1933. Of 300 scheduled flights, 294 were completed. The flying time for the year was 365 hr.; the distance covered, 71,300 mi.; passengers carried, 250; freight and mail, 30,000 lb. Since the company's service has been in operation, it has been a great success. The entire operation was carried out without a single accident involving injury to passenger or crew. The contract has been renewed for a further period of one year.

Adelaide-Sydney-Brisbane air service, contract which was awarded to the Eastern Australia Supply Co. of Melbourne in 1931, has not yet started operations. The date is due to a great many causes, one of which was the failure of the Melbourne Headland 122 commercial plane to obtain a certificate of airworthiness from the British air service.

Mr. Black, in announcing the postponement of his aircraft project, writes as follows:

"Here, in the Antipodes, I have fought an absolutely lost battle in aviation, nevertheless for nearly six years. In and out of my own, by the way, the machine was not one nearly \$20,000, with nothing to show for it but a few old films. I have had passed I have been in constant contact with the public, through lack of working capital, in a very long time. I have been able to stand on my feet long."

The publication office of Australia's has been transferred from Sydney to Melbourne, and all communications should be addressed to New 1161, GPO, Melbourne, Australia.

Australian airmail Australia all means in its flight in behalf of the Air Corps, and hopes that its contributions will have reached an end.

First Round Australia Flight

The first flight around Australia was recently completed by two Australian aviators, Wing Commander S. J. Cable and Young Officer L. E. McIntyre in a Focke D-12 airplane equipped with a 300 hp. Rolls Royce engine. The flight was made from Melbourne in anti-clockwise direction, that is, following the route of New South Wales, Queensland, the Northern Territory, Western Australia and South Aus-

tralia, with return to Melbourne. The flight was started April 8, and was completed May 16, the total distance of approximately 8,000 mi. being covered in 14 days' stopped time and 50 hr. flying time.

Considering that a very large portion of the route lay over great distances of uninhabited and largely unknown territory, and that except for fuel and a few places of preparation had been made for supplies, the performance is a very noteworthy one. The flight was made for the purpose of setting outside time for most definite air stations.

Notice to Aviators

Notice to Aviators No. 6 (1931), issued by the U. S. Hydrographic Office, contains information on airplane facilities in the Mexican Republic, Venezuela and the West Indies, and on general flying conditions in the West Indies.

The Notice to Aviators is a monthly publication whose function is to furnish to aviation information which will be of assistance to them in their operations, and is particularly in aviation may aid in making this publication effective by forwarding to the U. S. Hydrographic Office, Washington, D. C., any information of use to aviators.

SCADTA has First Serious Accident

Five persons were killed and one seriously injured at San Rafael, Colombia on June 8 when a Junkers airplane, belonging to the SCADTA company, flying over the city, fell into flames and fell on the roof of a private residence. Two of the killed were German aviators and the other prominent residents of Barranquilla.

The plane was up for the purpose of scattering propaganda literature over the city.

The SCADTA has been operating a mail and passenger service between the Atlantic coast to the Upper Magdalena River for the last four years and that was its first accident.

Copyright, 1924, by The Goodyear Tire & Rubber Co., Inc.

Efficient Airplane Equipment



Balloons and blimps of every type and size

RUBBER is as essential in the construction of most types of aircraft as metal, wood, or fabric.

It is significant that no substitute for rubber is sought. The efficient dependability of Goodyear Rubber satisfies designers, builders, and pilots.

Rather, new opportunities for Goodyear's experience, skill, and manufacturing facilities are continually presented by airmen. To execute these suggestions, and to originate others, Goodyear maintains a capable, skilled corps of aeronautical engineers.

The service of these men has a single purpose: to assist the progress of aviation. Behind them is the entire experience of a great organization that knows how to compound rubber for every purpose.

THE GOODYEAR RUBBER COMPANY, a subsidiary of The Goodyear Tire & Rubber Company, holds the U. S. patent and manufacturing rights of Kautschuk-Buna-Dephane, and is ready to supply Kautschuk-Buna-Dephane in any quantity for commercial or aviation purposes.

GOODYEAR
AVIATION EQUIPMENT

INDEX TO ADVERTISERS

A		
Airplane & Motor Supply Co.	101	101
American Propeller & Rig Co.	101	101
B		
Boeing Airplane Company	101	101
Brace, A. T.	101	101
C		
Classified Advertising	101	101
Curtis Export Co.	101	101
D		
DeSout. Marine-Aero Engine Co.	101	101
G		
Goodyear Tire & Rubber Co.	101	101
Greenleaf, Dr. L.	101	101
Gulf Coast Airline	101	101
H		
Hammond Aero Mfg. Co.	101	101
Hall Island Aero Corp.	101	101
I		
Ireland, G. B.	101	101
J		
Johnson Airplane & Supply Co.	101	101
Johnson Motor Products, Inc.	101	101
K		
Kellett Co., Inc., Waller	101	101
L		
Leach, E. B.	101	101
Ludington Lubrication Co.	101	101
M		
Martin, The Glass L. Co.	101	101
N		
Napier, D. & Son, Ltd.	101	101
Northrop, Marine A.	101	101
O		
Ostergaard Aircraft Works	101	101
P		
Potter Instrument Company	101	101
R		
Robertson Aircraft Corporation	101	101
S		
Sellers, Matthew B.	101	101
T		
Taps & Seale	101	101
Tennant, Inc.	101	101
W		
Warner, Edward P.	101	101
White & Phipps	101	101
Y		
Yockey Aircraft Co.	101	101

Announcing "The Story of Flying"

The Aircraft Year Book 1924

Published by
THE AERONAUTICAL CHAMBER OF COMMERCE OF AMERICA,
INCORPORATED

Now on the Press

Last year was the most significant year in aeronautics. It marked the coming of age of aviation. It saw the definite beginning of the change of flying from military to commercial. It saw the bringing to the United States of 33 out of 42 world records.

The Aircraft Year Book 1924
will have

150 pages of text covering aeronautics, military and commercial, in every country of the world.

40 pages of aircraft and engine drawings showing technical progress during 1923.

50 pages of photographs of important aeronautical events or illustrating the progress of aerial photography.

150 pages of reference data, statistics, reports, etc., covering commercial and governmental aviation throughout the world.

Every person interested commercially or patriotically should have a copy.

Every member of the National Aeronautic Association should have a copy as his reference book. The volume will contain much information of vital interest to the N.A.A.

Every member of the Army, Navy and Postal Air Services needs a copy.

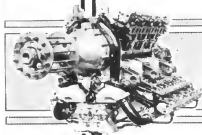
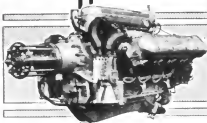
As the edition is limited, your order should be placed at once.

GARDNER PUBLISHING COMPANY, INC.
225 Fourth Avenue
New York, N. Y.

Enclosed please find \$5.25 (check, money order, draft). Please send me postpaid (U. S.) one copy 1924 Aircraft Year Book.

Name _____

Address _____



*The best proof of the superiority of
the 450 h.p. Napier Aero Engine
is its popularity.*

The majority of new type aeroplanes built to the order of the British Air Ministry are fitted with Napier engines.

More Napier engines are employed on British Continental Air Lines than any other type—one Napier engine alone has covered over 110,000 miles (1100 hours flying).

The Napier aero engine is preferred to any other type of engine because of its—

**Reliability Speed
Comfort and Economy**

The last three Aerial Derbys, open to all comers, have been won by Napier engined machines.

The 1000 h.p. Napier Aero engine is the highest powered engine in the World to be granted a British Air Ministry certificate of Air-Worthiness.

NAPIER

D NAPIER & SON, LTD.

14, New Burlington Street, W.1
Works: ACTON, LONDON
W.3.

